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Decoding M87's emission: A New Physically Consistent Model for Its Active Nucleus

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We present preliminary results of our attempt to build a physically consistent model for the active nucleus of the galaxy M87, based on the GRMHD simulations. Our model simultaneously reproduces the broad-band spectrum and intensity maps, offering a unified explanation of these observations. In our solution, most of the radiation observed at frequencies above 100 GHz originates from the inner accretion flow rather than the jet. Our results highlight the need to include the role of electron energy balance in modeling active galactic nuclei (AGN), demonstrating that commonly used artificial prescriptions for electron temperature tend to overestimate it, leading to discrepancies with observed properties. This work underscores the necessity of physically motivated electron thermodynamics for accurately interpreting high-resolution VLBI images of M87 and other AGN.

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